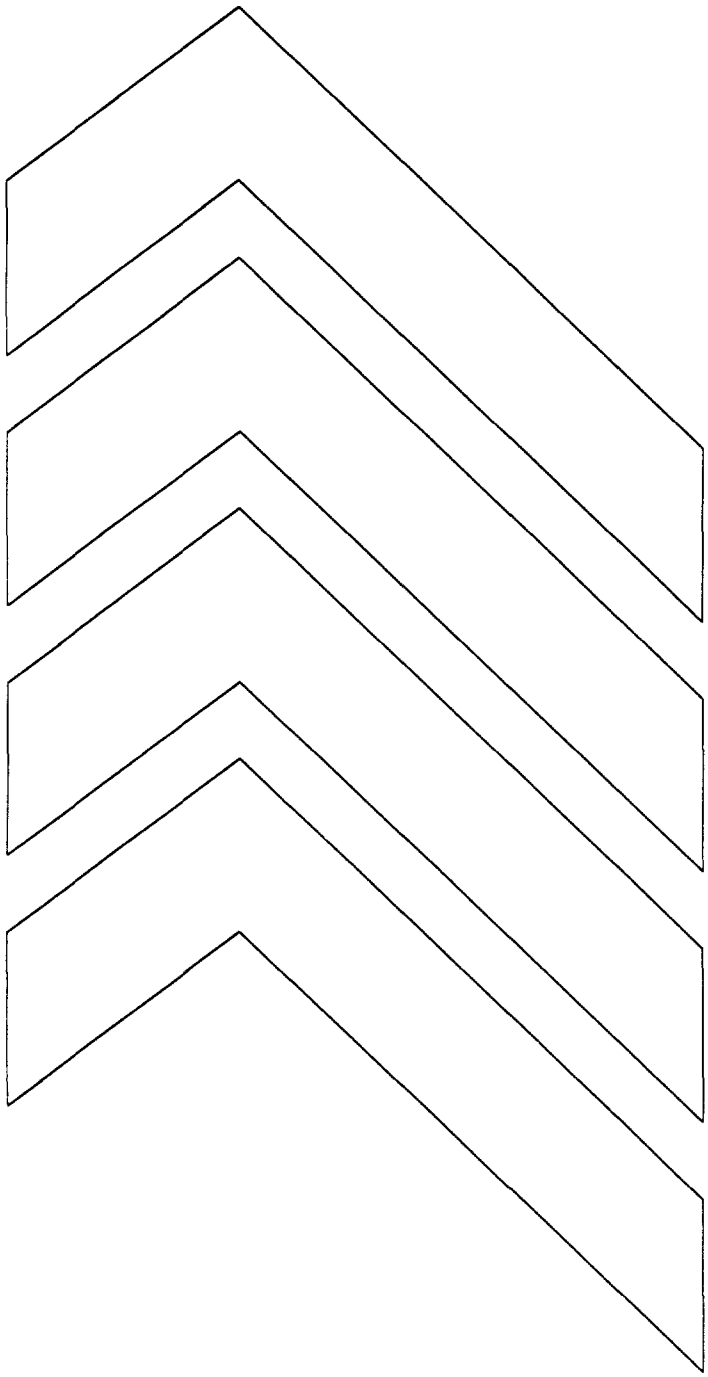
ET 95-19

NVLAP®

National
Voluntary
Laboratory
Accreditation
Program





# Fee Schedule and Worksheets

# Testing Laboratories

**U.S. Department of Commerce**
Technology Administration
National Institute of Standards
and Technology

NIST

# NVLAP® FEE SCHEDULE (Effective 10/24/94)

| PROGRAM/Field | ADMIN./ TECHNICAL SUPPORT FEE[1] | INIT. APPL. FEE[2] | ON-SITE ASSESS. FEE[3] | PROFICIENCY TESTING FEE[1] | TEST METHOD FEE |
|---|---|---|---|---|---|
| **CALIBRATION[4] - STAGE 1** | | $1,500 | | | |
| **STAGE 2** | $3,600 (1st field)<br>$800 (ea. addl. field) | | Variable[5] | $1,000 per field | NA |
| Dimensional | | | | | |
| Electromagnetics-DC/Low Freq. | | | | | |
| Electromagnetics-RF/Microwave | | | | | |
| Ionizing Radiation | | | | | |
| Mechanical | | | | | |
| Optical Radiation | | | | | |
| Thermodynamic | | | | | |
| Time and Frequency | | | | | |
| **COMPUTER/ELECTRONICS** | (See endnote [6]) | $500 | Variable[5] | NA | $150 per t.m. |
| GOSIP | $3,600 | | | | |
| POSIX | $3,600 | | | | |
| FCC | $2,600 | | | | |
| MIL-STD-462 | $2,600 | | | | |
| **DOSIMETRY** | $3,000[6] | $500 | $2,000 | Variable[7] | $50 per t.m. |
| **ENVIRONMENTAL** | $2,600[6] | $500 | | | |
| Bulk Asbestos Fiber Analysis | | | $2,000 | $1,022 | $300 |
| Airborne Asbestos Fiber Analysis | | | $2,200 | $4,305 | $400 |
| Bulk/Airborne Combined[8] | | | $2,400 | $5,327 | $700 |
| **FASTENERS AND METALS[9]** | $3,100[6] | $500 | Variable[5] | (See endnote [10]) | NA |
| M&P/Nondestructive/Metallography | | | | | |
| Dimensional Inspection | | | | | |
| Chemical Analysis | | | | | |
| **PRODUCT TESTING** | $2,600[6] | $500 | | | $50 per t.m. |
| Acoustics | | | $2,000 | None | |
| Carpet and Carpet Cushion | | | $1,800 | $ 900 | |
| Construction | | | $2,000 | (See endnote [11]) | |
| Efficiency of Electric Motors | | | $2,400 | (See endnote [10]) | |
| Energy Efficient Lighting | | | $2,400 | $1,000 | |
| Paints, Paper, Plastics, Plumbing, and Seals/Sealants | | | Variable[5] | (See endnote [11]) | |
| Thermal Insulation | | | $1,800 | $ 700 | |
| Wood Based Products | | | $2,200 | $1,800 | |

1 The Administrative/Technical Support Fee and the Proficiency Testing Fee are assessed annually on a laboratory's anniversary, regardless of the laboratory's current accreditation status.

2 The Initial Application Fee is paid one time per laboratory only.

3 The On-Site Assessment Fee is due every other year. Pay this fee only for the year in which an on-site assessment is scheduled to be performed.

# NVLAP FEE SCHEDULE (Effective 10/24/94) - continued

[4] Due to the variability of the Calibration program from one laboratory to another, application for the program is a two-stage process. See Calibration Laboratories Program-Specific application for explanation and instructions.

[5] Contact NVLAP for determination of the On-Site Assessment Fee.

[6] If more than one field of testing is selected, there is an $1,800 discount to the Administrative/Technical Support Fee for each additional field. Call NVLAP at 301-975-4016 for details.

[7] The Proficiency Testing Fee is calculated on the Dosimeter and Test Category Selection Worksheets contained in the Dosimetry Program-Specific Application package. The proficiency testing fee is due every other year. Pay this fee only when you are notified that proficiency testing is scheduled to be performed.

[8] To qualify for the combined Bulk/Airborne rate, a laboratory must have the same Authorized Representative, renewal date, and on-site assessment schedule for both Bulk and Airborne. Otherwise, an additional $800.00 Administrative/Technical Support Fee and separate On-Site Assessment Fees will be assessed.

[9] The approved fees for the Fasteners and Metals program will be effective on the date the final Fastener regulation is published in the *Federal Register*.

[10] Proficiency testing will not be initiated until an appropriate population of laboratories has enrolled in the program. Laboratories will be invoiced when proficiency testing is implemented.

[11] Proficiency tests for Construction, Paints, and Paper are conducted through outside testing services, and fees are paid by laboratories directly to the provider of service.

# NVLAP® FEE CALCULATION WORKSHEET

# TESTING LABORATORIES

Lab Name _____ NVLAP Lab Code _____

Address _____

City _____ State _____ Zip _____

**A separate Fee Calculation Worksheet must be completed for each field of testing.**

Field of Testing _____

**Enter fee amounts from the NVLAP Fee Schedule for the field of testing selected.**

1. Administrative/Technical Support Fee — Line 1 _____

2. Initial Application Fee
(Enter zero if this is a renewal application.) — Line 2 _____

3. On-Site Assessment Fee
(Note: Contact NVLAP for determination of the On-Site Assessment Fee, if the fee is shown as "Variable" on the NVLAP Fee Schedule.) — Line 3 _____

4. Proficiency Testing Fee — Line 4 _____

5a. Test Method Fee (each) — Line 5a _____

5b. Number of test methods selected
(Note: Asbestos labs always enter 1 on Line 5b.) — Line 5b _____

5c. Total Test Method Fee (Multiply Line 5a by Line 5b) — Line 5c _____

***If laboratory has existing subfacilities, complete Line 6; otherwise enter zero on Line 6 and skip to Line 7.***

6. Enter Total Subfacility Fee from Line 9 of the Subfacility Fee Calculation Worksheet.
(Note: This option is only available to laboratories that applied as subfacilities prior to October 1, 1993.) — Line 6 _____

7. **TOTAL FEE FOR THIS FIELD OF TESTING** (Add Lines 1 through 4, 5c, and 6) — Line 7 _____

**Go to Page 2 for payment instructions.**

NVLAP LAB CODE: [ ]

Remit the TOTAL FEE shown on Line 7 with the application package. Please check the payment method selected:

☐ Check. Make check payable to: National Institute of Standards and Technology. Write "NVLAP" and your Lab Code (if assigned) on the check to ensure proper credit.

☐ Purchase order. Attach copy of purchase order to Fee Calculation Worksheet. The NIST Billing and Collections Department will invoice your laboratory for the total fee amount.

☐ Charge card. Complete the *Authorization to Charge Mastercard or Visa* below.

Send application and fees to: National Institute of Standards and Technology
NVLAP/Accounts
Route 270 and Quince Orchard Road
Bldg. 101, Room A807
Gaithersburg, MD 20899.

**AUTHORIZATION TO CHARGE MASTERCARD OR VISA**

Please charge this amount $ _____ to the following Credit Card:

MasterCard Account Number: _____ Expiration: _____

Visa Account Number:_____ Expiration: _____

Name of Card Holder: _____

Signature of Card Holder: _____ Date: _____

Office Phone: (____)_____ Home Phone: (____)_____

Please be sure that the addition of this amount will not extend your charge card balance beyond your current credit card limit.

ET-95-19

NVLAP®

National
Voluntary
Laboratory
Accreditation
Program



# Electromagnetic Compatibility and Telecommunications

- FCC TEST METHODS
- MIL-STD-462 TEST METHODS

# Program-Specific Application

**U.S. Department of Commerce**
Technology Administration
National Institute of Standards
and Technology

NIST

NVLAP LAB CODE: [ ]

# ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS TEST METHOD SELECTION LIST - FCC TEST METHODS

**Instructions:** Check each test method for which you are requesting accreditation.

**FCC TEST METHODS for 47 CFR PART 15 AND PART 68**

| | *NVLAP Code* | *Test Method Designation* |
|---|---|---|
| _____ | 12/C01 | Conducted Emissions, Power Lines, 450 KHz to 30 MHz<br>FCC Method - 47 CFR Part 15 - Digital Devices |
| _____ | 12/R01 | Radiated Emissions<br>FCC Method - 47 CFR Part 15 - Digital Devices |
| _____ | 12/T01 | Terminal Equipment Compatibility<br>FCC Method - 47 CFR Part 68 Subpart D<br>68.302 Environmental simulation, Para. c, d, e, f<br>68.304 Leakage current limitations<br>68.306 Hazardous voltage limitations<br>68.308 Signal power limitations<br>68.310 Longitudinal balance limitations<br>68.312 On-hook impedance limitations<br>68.314 Billing protection |
| _____ | 12/T02 | Terminal Equipment Compatibility,<br>FCC Method - 47 CFR Part 68 Subpart D<br>68.316 Hearing Aid Compatibility: Technical standards |
| _____ | 12/T03 | Terminal Equipment Compatibility,<br>FCC Method - 47 CFR Part 68 Subpart D<br>68.302 Environmental simulation, Para. a, b |

TOTAL NUMBER OF TEST METHOD OPTIONS SELECTED:

A. If you selected 12/C01 and/or 12/R01, enter "1" on Line A — Line A _____

B. If you selected 12/T01 and/or 12/T02 and/or 12/T03, enter "1" on Line B — Line B _____

C. Add Lines A and B. Enter the total here and on Line 5b of the Fee Calculation Worksheet for FCC Test Methods — Line C _____

Complete the Application Supplement on the following pages.

NVLAP LAB CODE: [ ]

# ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS APPLICATION SUPPLEMENT - FCC TEST METHODS

## QUALITY ASSURANCE MANUAL:

Before the initial on-site assessment and for renewals requiring an on-site assessment, please provide NVLAP with a copy of the laboratory quality manual. The manual may accompany this application or may be sent at a later date. The NVLAP on-site assessor(s) will review the manual *before conducting* the on-site assessment of the laboratory and return it afterwards.

### 12/C01 - CONDUCTED EMISSIONS

Provide the name of the manufacturer and model of **one representative instrument** of each type which the assessor may closely examine during the on-site visit. Describe any of the instruments which are special, modified, or custom designed. Indicate the total number of like or similar instruments used to conduct this test.

***Instrument:*** EMI Meter, Spectrum Analyzer, CISPR Quasi-Peak Detector, Peak Detector

### 12/R01 - RADIATED EMISSIONS

Provide the name of the manufacturer and model of **one representative instrument** of each type which the assessor may closely examine during the on-site visit. Describe any of the instruments which are special, modified, or custom designed. Indicate the total number of like or similar instruments used to conduct this test.

***Instrument:*** EMI Meter, Spectrum Analyzer, CISPR Quasi-Peak Detector, Peak Detector

Give the geographical location of the test site(s). How far is it from the laboratory site? Is the site(s) currently on the FCC facility listing per 47 CFR Part 2.948?

### 12/T01 - TERMINAL EQUIPMENT COMPATIBILITY

Provide the name of the manufacturer and model of **one representative instrument** of each type which the assessor may closely examine during the on-site visit. Describe any of the instruments which are special, modified, or custom designed. Indicate the total number of like or similar instruments used to conduct this test.

***Instrument:*** Surge Generator, True RMS Voltmeter, DC Voltmeter, DC Ammeter, Balance Test Set, Ringing Generator, AC Voltmeter, AC Power Supply or Leakage Current Test Set, DC Power Supply, Loop Simulator, Weighting Circuits, Analyzer, Oscillator (Amplifier), Filter, Vibration Table, Environmental Chamber

# ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS APPLICATION SUPPLEMENT - FCC TEST METHODS

## 12/T02 - TERMINAL EQUIPMENT COMPATIBILITY HEARING AID COMPATIBILITY

Provide the name of the manufacturer and model of **one representative instrument** of each type which the assessor may closely examine during the on-site visit. Describe any of the instruments which are special, modified, or custom designed. Indicate the total number of like or similar instruments used to conduct this test.

***Instrument:*** Bandpass Filter, Feed Circuit, Helmholz Coil, Level Recorder, Oscillator, Probe Coil, True RMS Voltmeter

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NVLAP LAB CODE: [ ]

## ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS TEST METHOD SELECTION LIST - MIL-STD-462 TEST METHODS

**Instructions:** Check each test method for which you are requesting accreditation.

**MIL-STD-462 - Measurement of Electromagnetic Interference Characteristics**

| | *NVLAP Code* | *Test Method Designation* |
|---|---|---|
| _____ | 12/A01 | MIL-STD-462 Method CE01 |
| _____ | 12/A04 | MIL-STD-462 Method CE02 |
| _____ | 12/A06 | MIL-STD-462 Method CE03 |
| _____ | 12/A08 | MIL-STD-462 Method CE04 |
| _____ | 12/A10 | MIL-STD-462 Method CE06 |
| _____ | 12/A12 | MIL-STD-462 Method CE07 |
| _____ | 12/B01 | MIL-STD-462 Method CS01 |
| _____ | 12/B02 | MIL-STD-462 Method CS02 |
| _____ | 12/B04 | MIL-STD-462 Method CS03/CS04/CS05/CS08 |
| _____ | 12/B05 | MIL-STD-462 Method CS06 |
| _____ | 12/B06 | MIL-STD-462 Method CS07 |
| _____ | 12/B07 | MIL-STD-462 Method CS09 |
| _____ | 12/B08 | MIL-STD-462 Method CS10 |
| _____ | 12/B09 | MIL-STD-462 Method CS11 |
| _____ | 12/B10 | MIL-STD-462 Method CS12 |
| _____ | 12/B11 | MIL-STD-462 Method CS13 |

NVLAP LAB CODE: [ ]

## ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS TEST METHOD SELECTION LIST - MIL-STD-462 TEST METHODS

**MIL-STD-462 (continued)**

| | *NVLAP Code* | *Test Method Designation* |
|---|---|---|
| _____ | 12/D01 | MIL-STD-462 Method RE01 |
| _____ | 12/D02 | MIL-STD-462 Method RE02 |
| _____ | 12/D03 | MIL-STD-462 Method RE03 |
| _____ | 12/E01 | MIL-STD-462 Method RS01 |
| _____ | 12/E02 | MIL-STD-462 Method RS02 |
| _____ | 12/E03 | MIL-STD-462 Method RS03 (Consult laboratory for field strengths available) |
| _____ | 12/E04 | MIL-STD-462 Method RS03 Employing RADHAZ procedures for high level testing (Consult laboratory for field strengths available) |
| _____ | 12/E05 | MIL-STD-462 Method RS05 |
| _____ | 12/E07 | MIL-STD-462 Method RS06 |

_____ Total number of test methods selected. (Enter this total on Line 5b of the Fee Calculation Worksheet for MIL-STD-462.)

Complete the Application Supplement on the next page.

NVLAP LAB CODE: [ ]

# ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS APPLICATION SUPPLEMENT - MIL-STD-462 TEST METHODS

## QUALITY ASSURANCE MANUAL:

Before the initial on-site assessment and for renewals requiring an on-site assessment, please provide NVLAP with a copy of the laboratory quality manual. The manual may accompany this application or may be sent at a later date. The NVLAP on-site assessor(s) will review the manual *before conducting* the on-site assessment of the laboratory and return it afterwards.

## TEST EQUIPMENT IDENTIFICATION:

Provide a list of equipment used by the laboratory in the conduct of the test methods for which accreditation in being sought.

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NVLAP LAB CODE: [redacted]

# GENERAL OPERATIONS CHECKLIST

**Instructions to the Assessor:** This checklist addresses general accreditation criteria prescribed in applicable sections of NIST Handbook 150, *NVLAP Procedures and General Requirements*.

This checklist follows and is numbered to correspond to the *NVLAP Procedures and General Requirements*, Subsection 285.33. The numbers in square brackets identify related checklist items. A small black triangle appears in the left-hand margin of selected lines of text throughout this checklist; the marked text applies only to the Calibration Laboratory Accreditation Program (LAP).

Place an "X" beside each checklist item which represents a deficiency. Place a "C" beside each item on which you are commenting for other reasons. Record the item number and your written deficiency explanations and/or comments in this list or on the attached comment sheets. Place a check beside all other items you observed or verified at the laboratory.

## SEC. 285.33 CRITERIA FOR ACCREDITATION

**(b) *Organization and management***

(1) The laboratory shall be:

_____ (i) legally identifiable;

Legal name of laboratory ownership: _____

(ii) organized and shall operate in such a way that its permanent, temporary and mobile facilities meet the NVLAP requirements [see also (b)(2)(i), (c)(2)(ii)];

_____ (iii) properly identified on the NVLAP Application.

(2) The laboratory shall:

_____ (i) have managerial staff with the authority and resources needed to discharge their duties [see also (b)(1)(ii), (c)(2)(ii)];

_____ (ii) have policies to ensure that its personnel are free from any commercial, financial and other pressures which might adversely affect the quality of their work;

_____ (iii) be organized in such a way that confidence in its independence of judgement and integrity is maintained at all times;

_____ (iv) specify and document the responsibility, authority and interrelation of all personnel who manage, perform or verify work affecting the quality of calibrations and tests;

_____ (v) provide supervision by persons familiar with the calibration or test methods and procedures, the objective of the calibration or test, and the assessment of the results. The ratio of supervisory to non-supervisory personnel shall be such as to ensure adequate supervision;

_____ (vi) have a technical manager (however named) who has overall responsibility for the technical operations;

Name of person: _____

_____ (vii) have a quality manager (however named) who has responsibility for the quality system and its implementation. The quality manager shall have direct access to the highest level of management at which decisions are taken on laboratory policy or resources, and to the technical manager. In some laboratories, the quality manager may also be the technical manager or deputy technical manager;

Name of person: _____

_____ (viii) nominate deputy(ies) in case of absence of the technical or quality manager;

Name(s): _____

_____ (ix) have documented policy and procedures to ensure the protection of clients' confidential information and proprietary rights [see also (c)(2)(xviii)];

_____ (x) where appropriate, participate in interlaboratory comparisons and proficiency testing programs [see also (c)(2)(xiv), (c)(6)(ii), (g)(3)];

_____ (xi) have documented policy and procedures to ensure that its clients are served with impartiality and integrity.

**(c) *Quality system, audit and review***

(1) The laboratory shall:

_____ (i) have an established and maintained quality system appropriate to the type, range and volume of calibration and testing activities it undertakes;

_____ (ii) have the elements of the quality system documented;

_____ (iii) ensure that the quality documentation is available for use by the laboratory personnel;

_____ (iv) define and document its policies and objectives for, and its commitment to, good laboratory practice and quality of calibration or testing services;

_____ (v) have the laboratory management which ensures that these policies and objectives are documented in a quality manual and communicated to, understood, and implemented by all laboratory personnel concerned;

_____ (vi) ensure that the quality manual is maintained current under the responsibility of the quality manager [see also (c)(2)(iv)].

Date of quality manual: _____

Date of latest update: _____

(2) The quality manual, and related quality documentation, shall state the laboratory's policies and operational procedures established in order to meet the NVLAP requirements. The quality manual and related quality documentation shall contain:

_____ (i) a quality policy statement, including objectives and commitments, by top management;

_____ (ii) the organization and management structure of the laboratory, its place in any parent organization and relevant organizational charts;

_____ (iii) the relations between management, technical operations, support services and the quality system;

_____ (iv) procedures for control and maintenance of documentation [see also (c)(1)(vi), (j)(1)];

_____ (v) job descriptions of key staff and reference to the job descriptions of other staff;

_____ (vi) identification of the laboratory's approved signatories (list here or in the comments section): _____

_____

_____ (vii) the laboratory's procedures for achieving traceability of measurements;

_____ (viii) the laboratory's scope of calibrations and/or tests;

_____ (ix) written procedures for ensuring that the laboratory reviews all new work to ensure that it has the appropriate facilities and resources before commencing such work;

_____ (x) reference to the calibration, verification and/or test procedures used;

_____ (xi) procedures for handling calibration and test items;

_____ (xii) reference to the major equipment and reference measurement standards used;

_____ (xiii) reference to procedures for calibration, verification and maintenance of equipment;

_____ (xiv) reference to verification practices including interlaboratory comparisons, proficiency testing programs, use of reference materials and internal quality control schemes [see also (b)(2)(x), (c)(6)(ii), (g)(3)];

(xv) procedures to be followed for feedback and corrective action whenever:

_____ a) testing discrepancies are detected, or

_____ b) departures from documented policies and procedures occur;

_____ (xvi) the laboratory management policies for departures from documented policies and procedures or from standard specifications;

_____ (xvii) procedures for dealing with complaints [see also (n)];

_____ (xviii) procedures for protecting confidentiality and proprietary rights [see also (b)(2)(ix)];

_____ (xix) procedures for audit and review;

_____ (xx) a description of the laboratory's policy regarding the use of the NVLAP logo;

▸ _____ (xxi) a statement of the laboratory's policy for establishing and changing ▸ calibration intervals for equipment it controls; and

▸ _____ (xxii) a statement of the laboratory's policy concerning the technique(s) to be used ▸ for determining measurement uncertainty and calibration/verification ▸ adequacy.

_____ (3) The laboratory shall arrange for audits of its activities at appropriate intervals to verify that its operations continue to comply with the requirements of the quality system. Such audits shall be carried out by trained and qualified staff who are, wherever possible, independent of the activity to be audited. Where the audit findings cast doubt on the correctness or validity of the laboratory's calibration or test results, the laboratory shall take immediate corrective action and shall immediately notify, in writing, any client whose work may have been affected.

The audits shall be objective and be conducted internally or on contract. The audits shall include both general criteria (documents, records and policies) and technical compliance (test methods and practices and calibration procedures).

_____ (4) The quality system adopted to satisfy the NVLAP requirements shall be reviewed at least once a year by the management to ensure its continuing suitability and effectiveness and to introduce any necessary changes or improvements.

_____ (5) All audit and review findings and any corrective actions that arise from them shall be documented. The person responsible for quality shall ensure that these actions are discharged within the agreed timescale.

(6) In addition to periodic audits the laboratory shall ensure the quality of results provided to clients by implementing checks. These checks shall be reviewed and shall include, as appropriate, but not be limited to:

_____ (i) internal quality control plans, such as control charts and other available statistical techniques;

**NOTE:** Measurement assurance techniques are acceptable means to control the measurement process and consistently produce the highest quality measurements.

_____ (ii) participation in proficiency testing or other interlaboratory comparisons [see also (b)(2)(x), (c)(2)(xiv), (g)(3)];

_____ (iii) regular use of certified reference materials and/or in-house quality control using secondary reference materials;

_____ (iv) replicate testings using the same or different methods;

_____ (v) retesting of retained items;

_____ (vi) correlation of results for different characteristics of an item.

**(d) *Personnel*** [see also (c)(2)(v)]

_____ (1) The testing laboratory shall have sufficient personnel, having the necessary education, training, technical knowledge and experience for their assigned functions.

_____ (2) The testing laboratory shall ensure that the training of its personnel is kept up-to-date.

_____ (3) Records on the relevant qualifications, training, skills and experience of the technical personnel shall be maintained by the laboratory.

**(e)** ***Accommodation (facilities) and environment*** [see also (i)(3)]

_____ (1) Laboratory accommodation, calibration and test areas, energy sources, lighting, heating and ventilation shall be such as to facilitate proper performance of calibrations or tests.

**NOTE:** Laboratory design will be, to the maximum extent practical, in accordance with the guidelines found in the NCSL Recommended Practice #7, *Laboratory Design*, July 25, 1993.

_____ (2) The environment in which these activities are undertaken shall not invalidate the results or adversely affect the required accuracy of measurement. Particular care shall be taken when such activities are undertaken at sites other than the permanent laboratory premises.

**NOTE:** It is expected that environments which do not meet generally accepted norms, such as those found in NCSL Recommended Practice #7, yet which exhibit the stability required to apply necessary correction factors, will be specified by the laboratory for the purpose of assessment of compliance with its own procedures to achieve its stated uncertainties.

_____ (3) The laboratory shall provide facilities for the effective monitoring, control and recording of environmental conditions as appropriate. Due attention shall be paid, for example, to biological sterility, dust, electromagnetic interference, humidity, voltage, temperature, and sound and vibration levels, as appropriate to the calibrations or tests concerned.

_____ (4) There shall be effective separation between neighboring areas when the activities therein are incompatible.

_____ (5) Access to and use of all areas affecting the quality of these activities shall be defined and controlled.

_____ (6) Adequate measures shall be taken to ensure good housekeeping in the laboratory.

**NOTE:** While it is the laboratory's responsibility to comply with relevant health and safety requirements, this is outside the scope of this assessment.

**(f)** ***Equipment and reference materials***

(1) The laboratory shall:

_____ (i) be furnished with all items of equipment (including hardware, software, and reference materials) required for the correct performance of calibrations and tests;

_____ (ii) in those cases where the laboratory needs to use equipment outside its permanent control, including rented, leased and client-owned equipment, ensure that the relevant NVLAP requirements are met.

_____ (2) All equipment shall be properly maintained. Maintenance procedures shall be documented. Any item of the equipment which has been subjected to overloading or mishandling, or which gives suspect results, or has been shown by verification or otherwise to be defective, shall be taken out of service, clearly identified and wherever possible stored at a specified place until it has been repaired and shown by calibration, verification or test to perform satisfactorily. The laboratory shall examine the effect of this defect on previous calibrations or tests.

_____ (3) Each item of equipment including reference materials shall, when appropriate, be labelled, marked or otherwise identified to indicate its calibration status.

_____ (4) Records shall be maintained of each item of equipment and all reference materials significant to the calibrations or tests performed. The records shall include:

_____ (i) the name of the item of equipment, software or reference material;

_____ (ii) the manufacturer's name, type identification, and serial number or other unique identification;

_____ (iii) date received and date placed in service;

**NOTE:** For initial accreditation, the date received and the date placed in service are not considered mandatory requirements for inclusion in laboratory records, although this is encouraged as good laboratory practice.

_____ (iv) current location, where appropriate;

_____ (v) condition when received (e.g. new, used, reconditioned);

_____ (vi) copy of the manufacturer's instructions, where available;

_____ (vii) dates and results of calibrations and/or verifications and date of next calibration and/or verification;

_____ (viii) details of maintenance carried out to date and planned for the future;

_____ (ix) history of any damage, malfunction, modification or repair;

▸ _____ (x) measured value observed for each parameter found to be out of tolerance
▸ during calibration/verification.

(g) ***Measurement traceability and calibration***

_____ (1) All measuring and testing equipment having an effect on the accuracy or validity of calibrations or tests shall be calibrated and/or verified before being put into service. The laboratory shall have an established program for the calibration and verification of its measuring and test equipment. The program will ensure the recall or removal from service of any standard or equipment which has exceeded its calibration interval or is otherwise judged to be unreliable.

_____ (2) The overall program of calibration and/or verification and validation of equipment shall be designed and operated so as to ensure that, wherever applicable, measurements made by the laboratory are traceable to national standards of measurement where available. Calibration certificates shall, wherever applicable, indicate the traceability to national standards of measurement and shall provide the measurement results and associated uncertainty of measurement and/or a statement of compliance with an identified metrological specification.

**NOTE:** Traceability to national standards includes traceability to standards maintained or defined at national laboratories in foreign countries where applicable. In these cases, traceability is achieved via international standards. This includes intrinsic standards of measurement where available.

Where applicable, the methodology of the *Guide to the expression of uncertainty in measurement*: 1993, shall be used as the basis for expression of uncertainty of the measurement. NIST Technical Note 1297; January 1993, *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, is a practical application document written around the *Guide to the expression of uncertainty in measurement*. Where detailed procedures are not used to quantify and combine uncertainties (i.e., use of test accuracy ratio concepts), the sources of uncertainty shall be tabulated and demonstrated to be acceptable for the measurement undertaken.

**NOTE:** A significant number of intrinsic standards, such as the Josephson Array Voltage Standard and the Iodine-Stabilized Helium-Neon Laser Length Standard, have been developed and are now being used by many national standards laboratories and some industrial laboratories. These standards are based on well-characterized laws of physics, fundamental constants of nature, or invariant properties of materials, and make ideal stable, precise, and accurate measurement standards if properly designed, characterized, operated, monitored and maintained. Where intrinsic standards are used, the laboratory should demonstrate by measurement assurance techniques, interlaboratory comparisons, or other suitable means, that its intrinsic standard measurement results are correlated with those of national or international standards.

_____ (3) Where traceability to national standards of measurement is not applicable, the laboratory shall provide satisfactory evidence of correlation of results, for example by participation in a suitable program of interlaboratory comparisons or proficiency testing [see also (b)(2)(x), (c)(2)(xiv), (c)(6)(ii)].

**NOTE:** Traceability requirements may also be satisfied by:

(i) internationally accepted standards in the field concerned;

(ii) suitable reference materials;

(iii) ratio or reciprocity measurements; or

(iv) mutual consent standards which are clearly specified and mutually agreed upon by all parties concerned.

_____ (4) Reference standards of measurement held by the laboratory shall be used for calibration only and for no other purpose, unless it can be demonstrated that their performance as reference standards has not been invalidated.

_____ (5) Reference standards of measurement shall be calibrated by a body that can provide traceability to a national standard of measurement. There shall be a program of calibration and verification for reference standards.

_____ (6) Where relevant, reference standards and measuring and testing equipment shall be subjected to in-service checks between calibrations and verifications.